

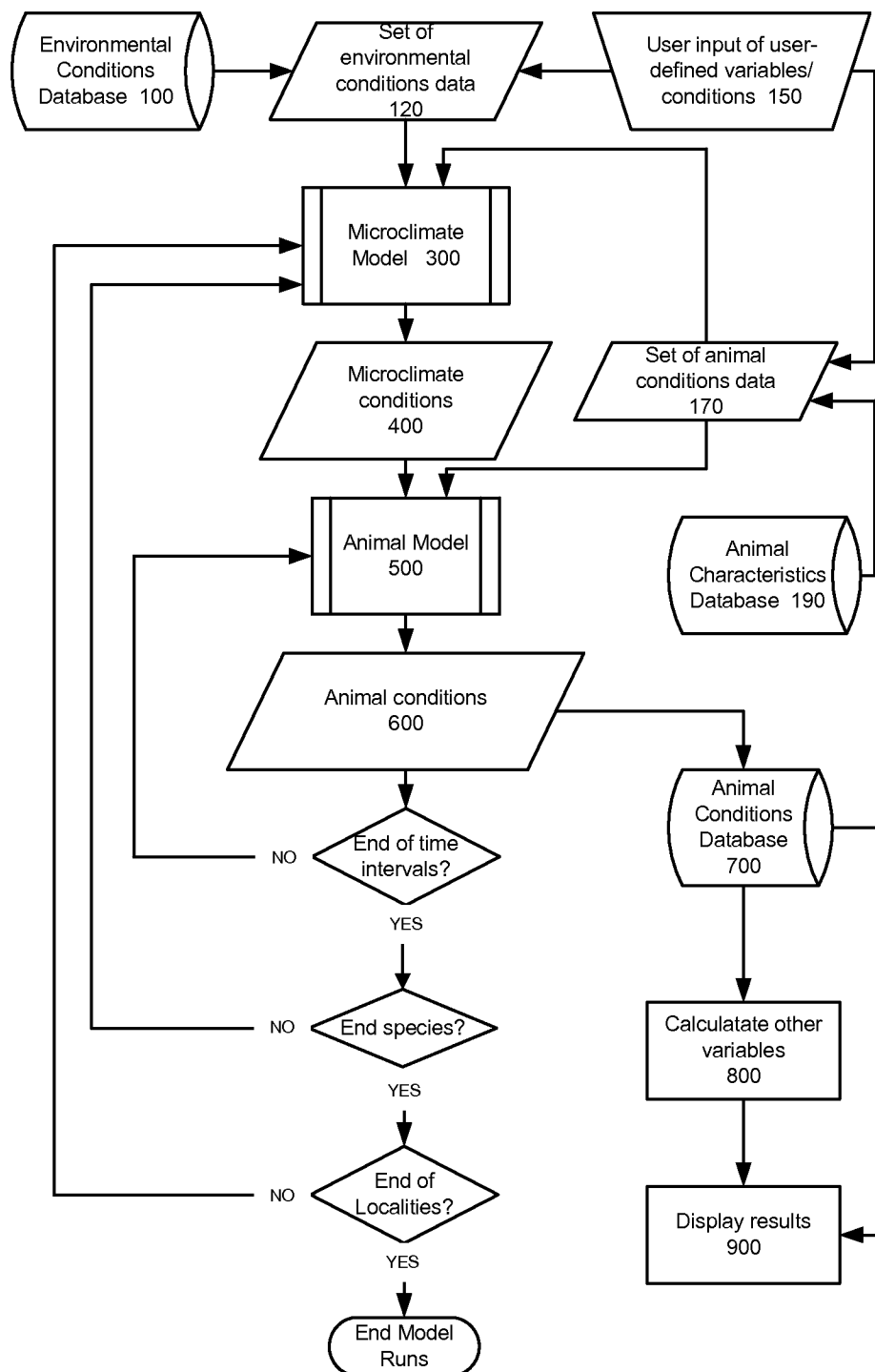
FIG. 1

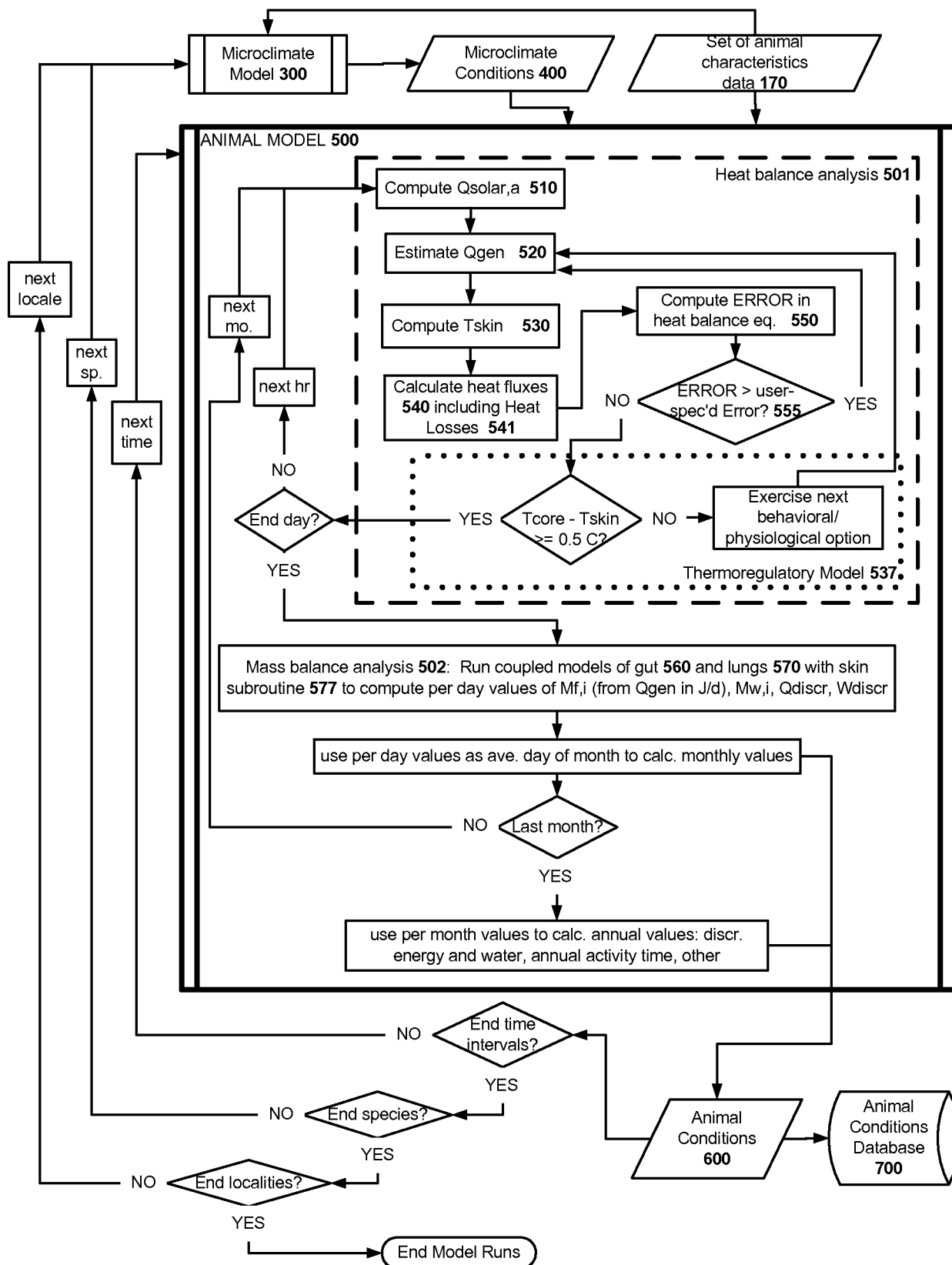
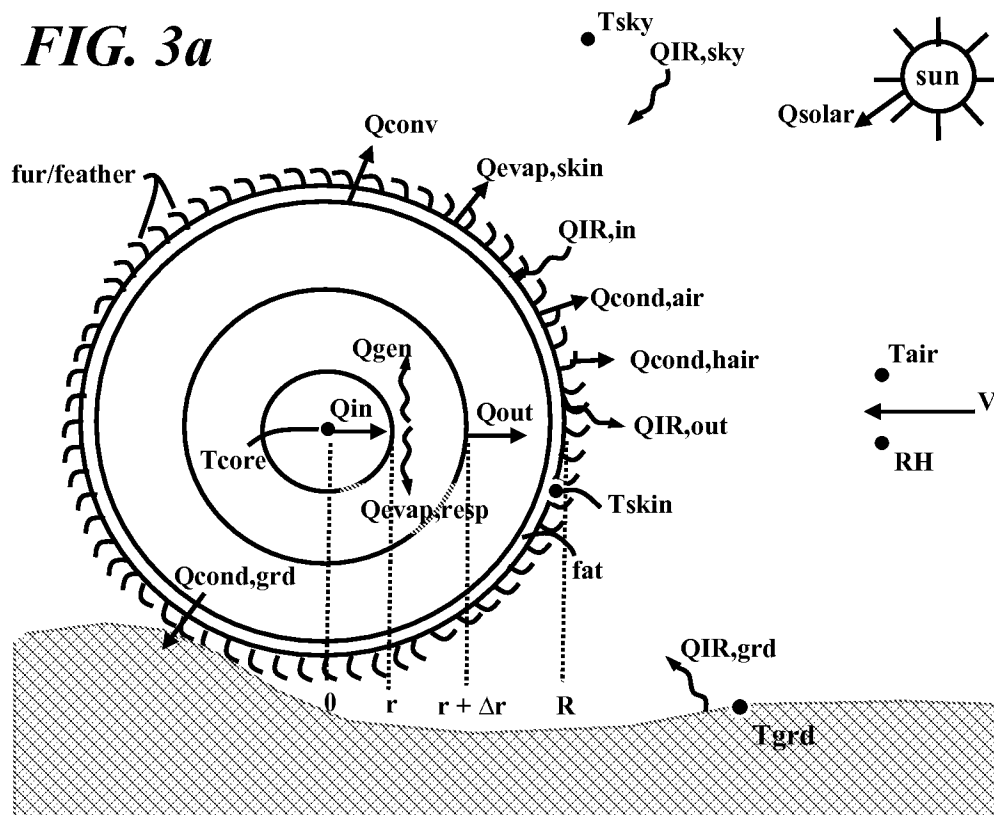
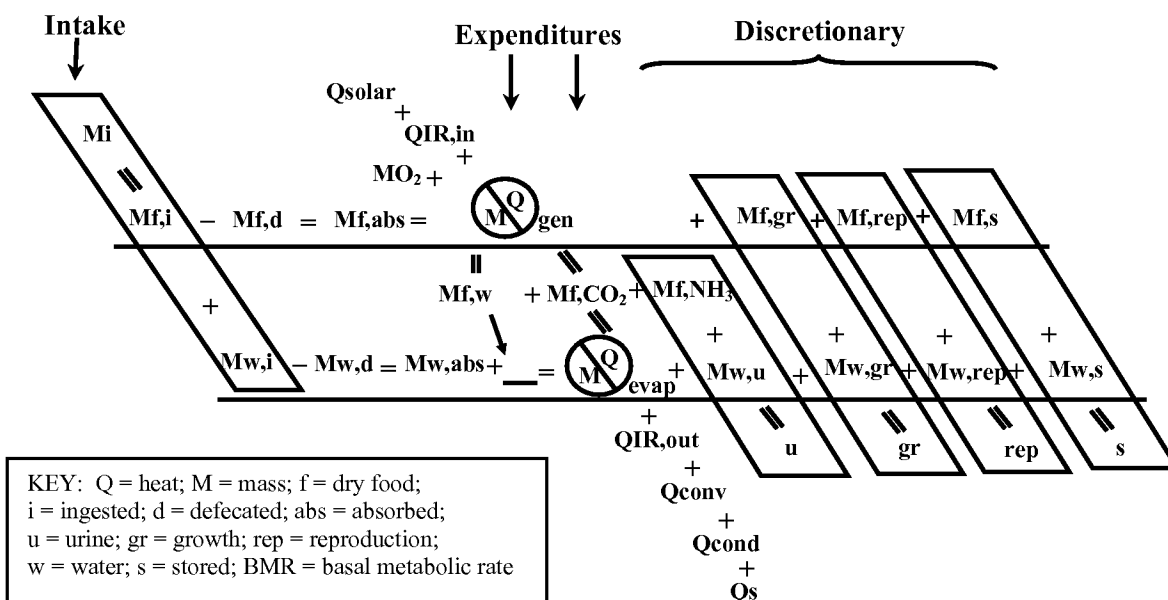
FIG. 2

FIG. 3a**FIG. 3b**

$$\left(\frac{Q}{M} \right)_{gen} = \left(\frac{Q}{M} \right)_{BMR} + \left(\frac{Q}{M} \right)_{Activity} + \left(\frac{Q}{M} \right)_{Synthesis} + \left(\frac{Q}{M} \right)_{Specific\ Dynamic\ Action}$$

FIG 4

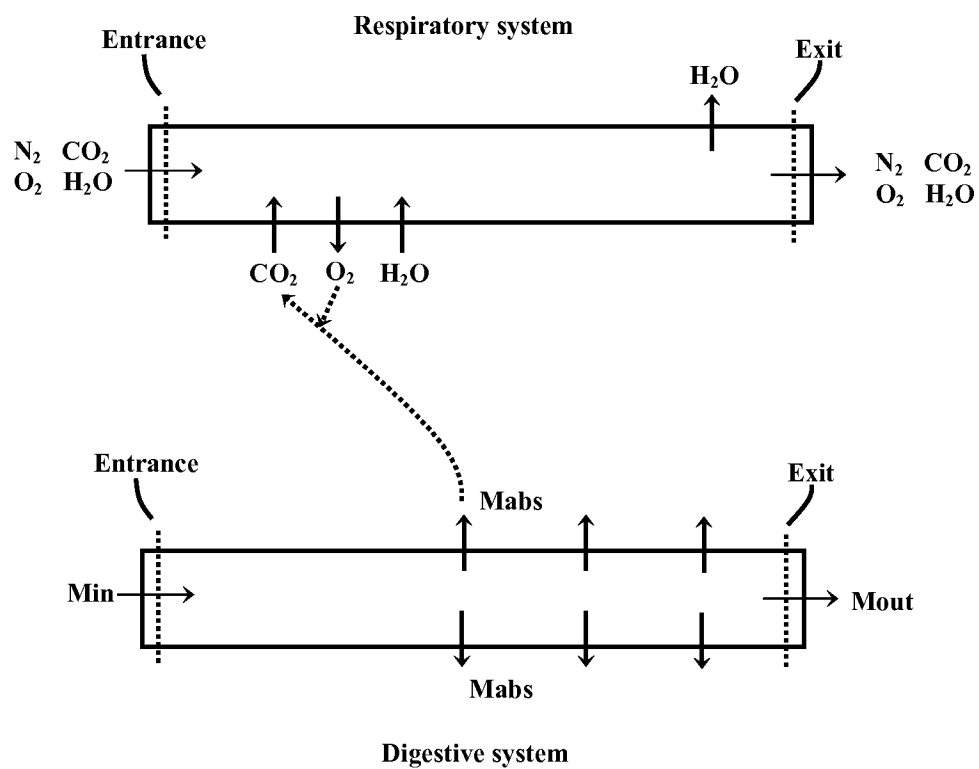


FIG. 5a

VARIABLE	DEFINITION
abs	Absorbed (unless otherwise noted).
ABSAN	Animal absorptivity.
ABSSB	The absorptivity of the substrate.
ashade	Percent shade on the animal.
ASILN	Silhouette area normal to the sun.
B1ARA(1)	A variable that indicates the optical thickness of the fur or feathers; it is the exponent of Beer's Law (<i>i.e.</i> the extinction coefficient (τ) times the depth of fur/feathers (t)).
BETARA(2)	The IR extinction coefficient of fur/feathers.
BICV	A dimensionless variable for convection heat transfer.
BIR	A dimensionless variable for IR heat transfer.
C1N	Is C1 normalized; a dimensionless variable.
d	Defecated
D1	D1 is a dimensionless variable.
DigEff	Digestive efficiency.
dir	Direct.
discr	Discretionary.
EMIS	The emissivity of the animal.
evap	Evaporated.
f	Food (dry food).
Fa,grd	The configuration factor between the animal and the ground.
Fa,sky	The configuration factor between the animal and the sky.
Fabush	The configuration factor between the animal and the nearby object.
g	The heat generation per unit volume.
gfatpg, gprotpg, gcarbpg	The grams of fat, protein, and carbohydrate per gram dry mass of food .
gr	Growth.
grd	Ground or other surface.
gundig	Undigested mass per gram dry mass of food.

FIG. 5b

gw	Grams water.
HC	HC is the convection heat transfer coefficient.
hor	Horizontal to.
HR	HR is the radiant heat transfer coefficient.
i	Ingested.
IR	Infrared.
Jabspgr	Joules absorbed per gram of dry food.
K	Thermal conductivity for tissue.
KEFAR	KEFAR is the effective thermal conductivity of fibers and air for conduction.
KRADSKY/ GRD/BUSH	The fur/feather radiant conductivity in the sky/ground/bush direction.
M	Mass.
Mdiscr	Total discretionary mass; $M_{w, \text{discr}} + M_{f, \text{discr}}$.
met	Metabolism.
$M_{f, a}$	Mass of food absorbed.
$M_{f, d}$	Mass of food defecated.
$M_{f, \text{discr}}$	Total discretionary mass from food; $M_{f, \text{gr}} + M_{f, \text{rep}} + M_{f, s}$.
$M_{f, \text{gr}}$	Discretionary mass from food available for growth.
$M_{f, i}$	Mass of food ingested.
$M_{f, \text{met}}$	Mass of food metabolized.
$M_{f, \text{rep}}$	Discretionary mass from food available for reproduction.
$M_{f, s}$	Discretionary mass from food stored.
$M_{f, w}$	Mass of water in food absorbed ($M_{f, a}$).
$M_{w, a}$	Mass of water absorbed.
$M_{w, d}$	Mass of water defecated in feces.
$M_{w, \text{discr}}$	Total discretionary mass from water ($M_{w, \text{gr}} + M_{w, \text{rep}} + M_{w, s}$).
$M_{w, \text{gr}}$	Discretionary mass from water available for growth.
$M_{w, i}$	Mass of water ingested.
$M_{w, \text{met}}$	Mass of water metabolized.
$M_{w, \text{rep}}$	Discretionary mass from water available for reproduction.
$M_{w, s}$	Discretionary mass from water stored.
$M_{w, u}$	Mass of water excreted in urine.
n	Geometry constant (varies with shape).
norm	Normal to.

FIG. 5c

PCTDIF	Percent diffuse solar radiation.
pctfat, pctpro, pctcar	User specified percentages of these components of food – fat, protein, carbohydrates.
PSI	PSI is a correction factor.
Q	Heat.
Qcond	Conduction (via air and fur/feathers) from dorsal and ventral sides of animal.
Qcond,air	Conduction via the air.
Qcond,hair	Conduction via the fur/feathers.
Qconv	Convection at the fur-air interface.
Qdiscr	Discretionary energy available to the animal.
Qdorsl	Amount of energy absorbed on the top/dorsal parts of animal.
Qevap,resp	Energy loss by evaporation in respiration.
Qevap,skin	Energy loss by evaporation at skin.
Qfur	Energy flux via the fur/feathers.
Qgen	The metabolic heat generation needed to maintain the animal's core temperature.
Qin	the amount of heat entering the animal from external sources (Qsolar,a, QIR,in, QIR,sky, QIR,grd, other sources).
QIR,above	The IR fluxes from above the animal.
QIR,below	The IR fluxes from below the animal.
QIR,grd	IR fluxes from the ground (or other surface).
QIR,in	IR radiation emitted inward through the porous insulation.
QIR,out	IR radiation emitted outward from the fiber elements toward the sky
QIR,sky	IR fluxes from the sky.
QIR,veg	IR fluxes from vegetation.
Qmet	Uniform heat generation.
Qnet	Net heat exchange for the whole animal.
Qnorm	Total solar radiation incident on a surface normal to the sun's direct beam.
Qout	the amount of heat leaving the animal to the environment .
QRADSK/ GRD/BUSH	The incoming solar IR radiation from the sky/ground/bush through the porous media.
Qresp	Uniform heat dissipation by respiration.
QSDIFF	The total amount of diffuse solar radiation.

FIG. 5d

QSOBJ	Incoming diffuse radiation reflected by an object nearby.
Qsolar	Clear sky solar radiation.
Qsolar,a	Amount of solar radiation (watts) absorbed by the animal.
Qsolar,dir	Direct beam solar radiation.
Qsolar,hor	The incoming solar radiation on a horizontal surface.
QSRSB	The incoming solar radiation reflected from the substrate (<i>i.e.</i> ground or other substrate).
QSSKY	The diffuse solar radiation from the sky (<i>i.e.</i> solar radiation scattered by molecules in the atmosphere and by clouds).
Qventr	Amount of energy absorbed on the bottom/ventral parts of animal.
R	Radius of animal.
Rep	Reproduction.
resp	Respiration.
RH	Relative humidity of air passing over the animal at its average height above ground.
RQ	Respiratory quotient..
S	Stored.
sig	The Stefan-Boltzmann constant.
Tair	Air temperature at animal's average height.
Tair,2m	Temperature of air at 2 m height.
TAVsky/grd/ bush	Sky/ground/bush portions of radiant heat exchange (degrees K).
Tgrd	Ground/surface temperature.
Tgrd(i)	The ground temperature at location (i).
Timbas	Basal multiplier (<i>i.e.</i> activity above resting).
TK	Temperature at degrees Kelvin.
TKair,TKskin, TKsky, TKbush	The temperatures of air, skin, sky, bush, respectively, in degrees K.
TOTCARB	Total carbohydrates.
TotJpgram	Joules per gram dry food.
Tskin	The skin temperature of the animal.
Tsky	Clear sky radiant temperature.
Tveg	Temperature of vegetation (or other objects) overhead of the animal.
U	Urine.
V	Velocity of air passing over the animal at its average height above ground.
w	Water.
Mw,evap	Mass of water lost by evaporation (Mw,evap,resp + Mw,evap,skin).
Mw,evap,resp	Water loss by evaporation in respiration.
Mw,evap,skin	Water loss by evaporation at skin.
ZFURAR	ZFURAR is the depth of fur.

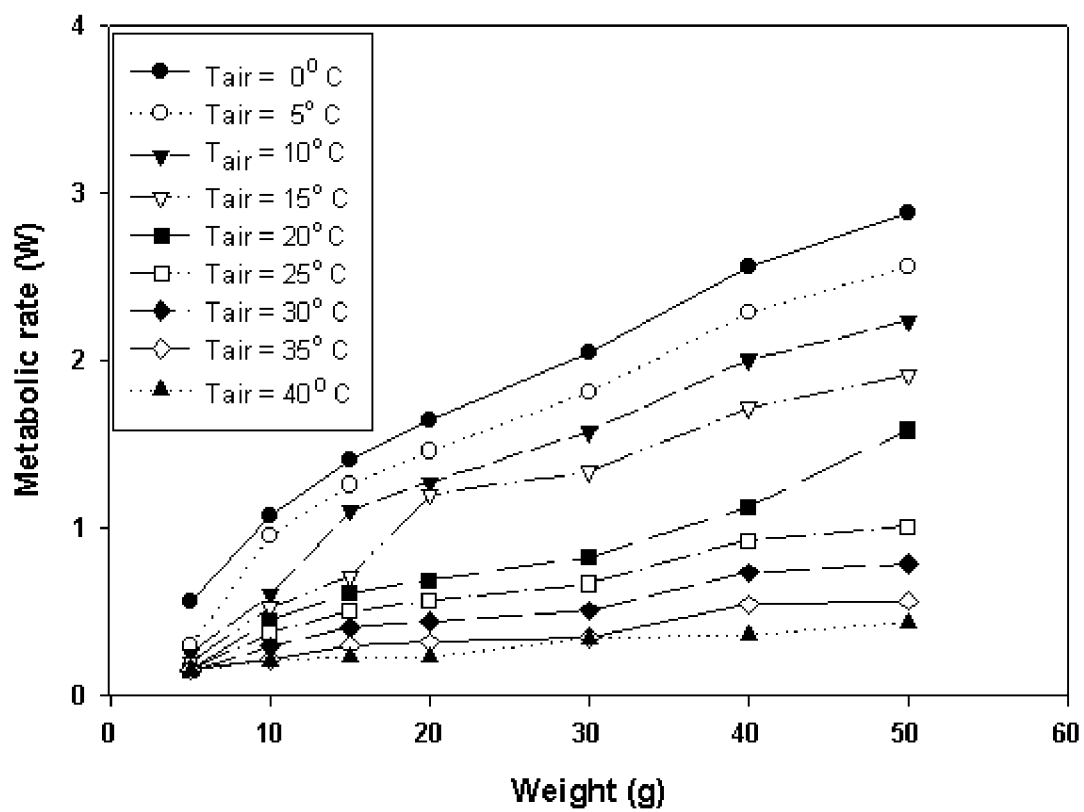
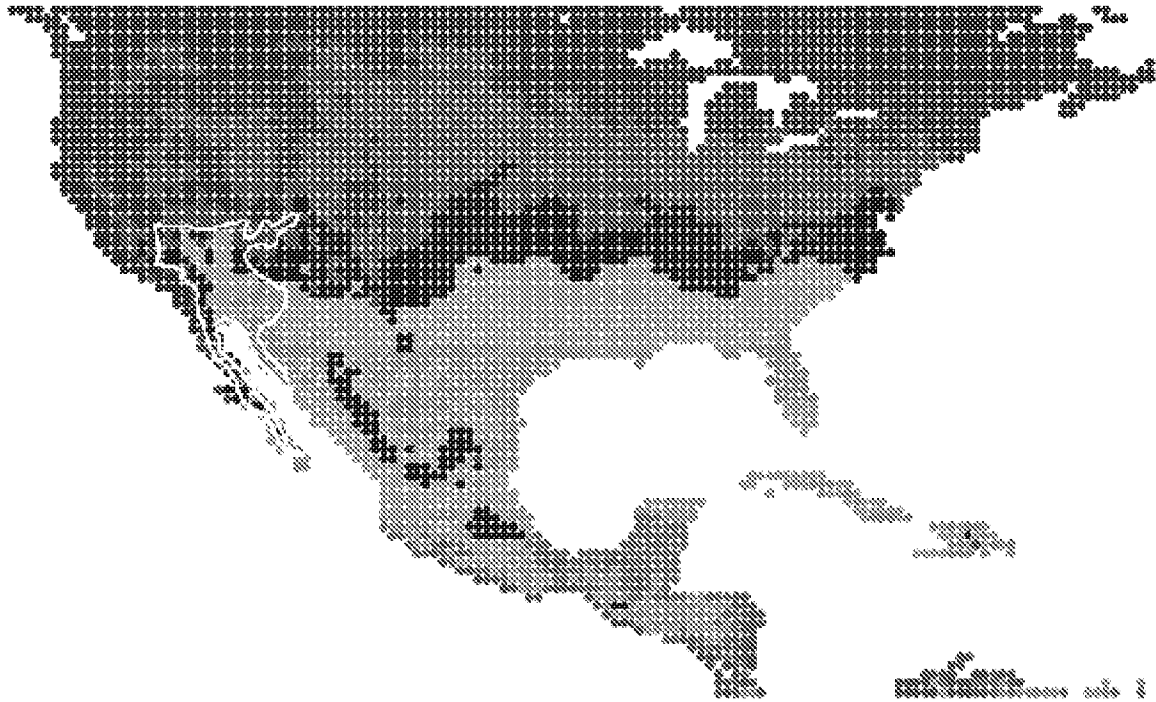
FIG. 6

FIG. 7



Degree days at 10 cm depth:

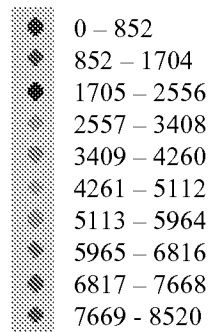


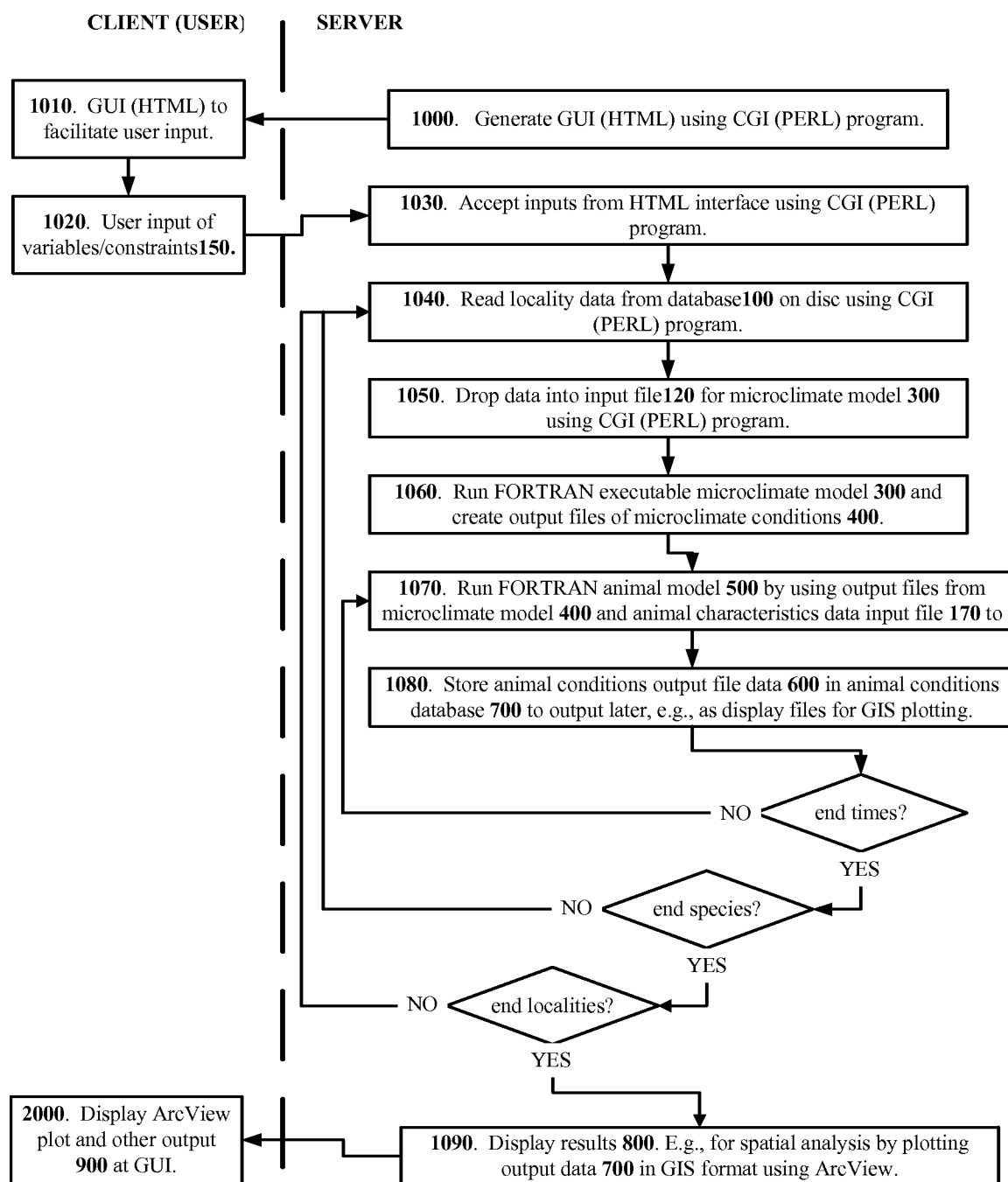
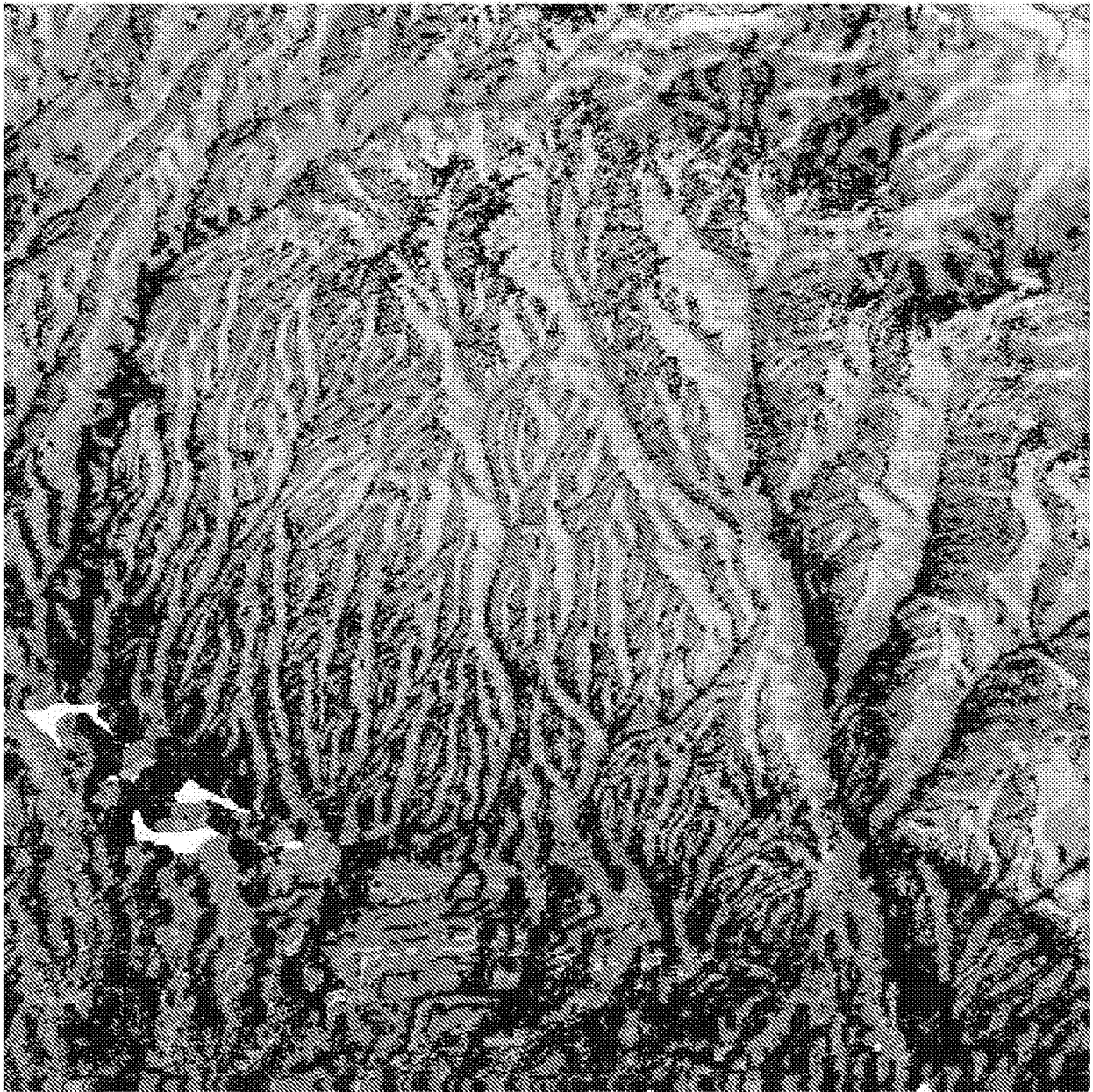
FIG. 8

FIG. 9

**Discretionary energy in July as a function of slope and aspect of topography
for Mountain Lion (kJ/d)**

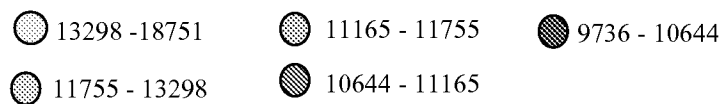


FIG. 10

